THE U. S. BUDGET DEFICIT FINANCING: THE TREASURY BILLS ALTERNATIVE

A THESIS

SUBMITTED TO THE FACULTY OF ATLANTA UNIVERSITY

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR

THE DEGREE OF MASTER OF ARTS

BY

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ATLANTA, GEORGIA

DECEMBER 1983

ACKNOWLEDGEMENT

I would like to extend my appreciation to Dr. Fred O. Boadu, my Advisor and Acting Chairman of the Department of Economics for his untiring effort in guiding me through, to the completion of this work. I am also very grateful to Mr. Keith Hinch, Dr. Charlie Carter and Dr. A. Williams who have given me valuable advise in the course of this work; and to Mr. Morufi Ajibola for the moral encouragement he offered me. Lastly, my appreciation goes to Miss Pauline Moore for her excellent job in getting this paper typed in time.

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INTRODUCTION

"The key barrier to a briskier (economic) turn around remains the federal budget deficit. The deficit is a menace because massive government borrowing is likely to keep interest rate up and force companies to delay investments in new plants and equipment such outlays have been lagging for more than two years and now are precisely what is needed for solid business growth."[1]

The accumulation of government borrowing from time to time is referred to as the Public (National) debt. Apart from the enormous cost in interest payments this debt has cost implications for taxpayers, and frustrates attempts at formulating consistent monetary policies by the Federal Reserve System (Fed). The Fed currently attempting to reduce a relatively high interest rate would find the staggering government borrowing activity inimical to its activities.

Between 1954 and 1974 the public debt rose from $224 billion to $346.1 billion representing about fifty-four percent increase (Table I). The federal deficit for the first half of fiscal 1983 reached a high $129.3 billion already surpassing the record $111 billion for all of 1982. Prolonged deficit of that size will choke economic recovery because the government must use a large portion of available credit to finance the deficit. The deficit also adds to the $1.24 trillion

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[1]Time Magazine, Economy and Business - Beginning to Build Up Steam, June 6, 1983, p. 38.

TABLE 1

COMPARISON OF TRENDS IN FEDERAL DEBT AND GROSS NATIONAL PRODUCT
(Dollar Amounts in Billions)

Fiscal Year	Debt Outstanding End of Year					GNP	Debt Held by Public as Percent of GNP
		Held by					
			The Public				
	Gross Federal Debt	Federal Government Accounts	Total	Federal Reserve System	Other		
1954.....	270.8	46.3	224.5	25.0	199.5	364.1	61.7
1955.....	274.4	47.8	226.6	23.6	203.0	381.7	59.4
1956.....	272.8	50.5	222.2	23.8	198.5	411.7	54.0
1957.....	272.4	52.9	219.4	23.0	196.4	434.5	50.5
1958.....	279.7	53.3	226.4	25.4	200.9	442.7	51.1
1959.....	287.8	52.8	235.0	26.0	209.0	472.1	49.8
1960.....	290.9	53.7	237.2	26.5	210.7	499.3	47.5
1961.....	292.9	54.3	238.6	27.3	211.4	510.1	46.8
1962.....	303.3	54.9	248.4	29.7	218.7	546.9	45.4
1963.....	310.8	56.3	254.5	32.0	222.4	579.0	43.9
1964.....	316.8	59.2	257.6	34.8	222.8	618.4	41.6
1965.....	323.2	61.5	261.6	39.1	222.5	660.5	39.6
1966.....	329.5	64.8	264.7	42.2	222.5	725.5	36.5
1967.....	341.3	73.8	267.5	46.7	220.8	776.2	34.5
1968.....	369.8	79.1	290.6	52.2	238.4	834.4	34.8
1969[1].....	367.1	87.7	279.5	54.1	225.4	911.0	30.7
1970[2].....	382.6	97.7	284.9	57.7	227.2	968.9	29.4
1971.....	409.5	105.1	304.3	65.5	238.8	1,032.7	29.5
1972.....	437.3	113.6	323.8	71.4	252.3	1,126.6	28.7
1973[3].....	468.4	125.4	343.0	75.2	267.9	1,255.2	27.3
1974.....	486.2	140.2	346.1	80.6	265.4	1,381.5	25.0
1975.....	544.1	147.2	396.9	85.0	311.9	1,480.5	26.8
1976[4].....	631.9	151.6	480.3	94.7	385.6	1,642.7	29.2
TQ.....	646.4	148.1	498.3	96.7	401.6	1,729.0	28.8
1977.....	709.1	157.3	551.8	105.0	446.8	1,864.0	29.6
1978.....	780.4	169.5	610.9	115.5	495.5	2,085.3	29.3
1979.....	833.8	189.2	644.6	115.6	529.0	2,357.8	27.3
1980.....	914.3	199.2	715.1	120.8	594.3	2,557.5	27.9
1981 estimate..	992.4	205.3	787.1	NA	NA	2,843.7	27.7
1982 estimate..	1,057.7	225.6	832.1	NA	NA	3,214.8	25.9
1983 estimate..	1,094.4	240.0	854.4	NA	NA	3,612.5	23.7
1984 estimate..	1,084.1	248.0	836.1	NA	NA	4,044.0	20.7

NA = Not available

[1]During 1969, 3 Government-sponsored enterprises became completely privately owned, and their debt was removed from the totals for the Federal Government. At the dates of their conversion, gross Federal debt was reduced $10.7 billion, debt held by Government accounts was reduced $0.6 billion, and debt held by the public was reduced $10.1 billion.

[2]Gross federal debt and debt held by public increased $1.6 billion due to a reclassification of the Commodity Credit Corporation certificates to interest from loans assets to debt.

[3]A procedural change in the recording of trust funds holdings of Treasury debt at the end of the month increased gross Federal debt and debt held in Government accounts by about $4.5 billion.

[4]Gross Federal debt and debt held by the public increased $0.5 billion due to a retroactive reclassification of the Export-Import Bank certicates of beneficial interest from loan assets to debt.

Source: Special Analysis: Budget of the United States Government, Fiscal Year 1982.

national debt which represents over 350 percent increase in less than ten years (the 1974 figures).

The view expressed by the Time board, available data and concern expressed by both academic and business community underscores the intensity of the controversy surrounding the enormity of the government budget deficit.

A budget deficit in a broad sense is an excess of planned government spending over planned revenues of the government. Symbolically, budget deficit (D) may be defined as the difference in government expenditure (G) and tax revenues (T) that is:

$$D = G - T \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

When there is planned underspending relative to planned revenue, one has a budget surplus and when planned spending equals planned revenue budget is balanced.

The idea of increased government spending or government deficit spending gained initial attention during the 1929/30 world economic depression. In his seminal work "the General Theory of Employment Interest and Money", John Maynard Keynes[2] proposed that the private sector was too erratic to maintain stability so that government intervention by fiscal policy was necessary to stabilize the economy. Keynes prescription is based on the inability of the "Invisible Hand" to stabilize the economy during this great depression as postulated by the classical economists. Keyne's prescription has been the dominant economic approach in modern day macroeconomic policy analyses.

However, because of the debilitating effect government borrowing could have on the economy, congress has from time to time attempted to limit the use of Keynes proposal by limiting national debt to a certain range. A congressional limit of $1.389 trillion national debt was imposed for the first half of 1983. Already consideration is been given to asking congress to increase this ceiling since this might be broken by the proposed federal government borrowing during the second half of the year (1983) to finance the deficit.

Government revenue comes mainly from taxes (Appendix 1).[3] This takes different forms. It includes personal income taxes, corporate taxes, import and export taxes (custom tariff) and a horde of other taxes. In order to reduce deficit spending government raises taxes to

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[2]Maynard J. Keynes, General Theory of Employment, Interest and Money.

[3]Appendix 1 shows budget receipt by source for 1980, '81 and '82 as published in the summary tables of the budgets for fiscal year 1982.

increase revenue. The deficit could then be financed by government borrowing. However, the effect of increased taxes during depression could cripple the necessary investment during this time. Therefore governments generally rely on borrowing and reducing the size of the deficit to an absorbable level to the economy.

The other alternative to financing deficit is by borrowing (sales of government security). Financing deficit by sales of government security could be done in two ways.[4] (a) Treasury bills sales to the Federal Reserve Bank (Fed) by the Treasury Department. The security purchased by the Fed is paid for by printing more money (currency) increasing the money supply growth. This method of financing the deficit is referred to as "monetizing the economy." The stabilizing effect of this is that it would lower interest rate, while it would act as a catalyst to an inflation triggered by increased government spending. However sales of government security to the Fed only account for less than thirty percent of source of deficit financing. (b) The Treasury Department could sell government security to the public (household and business sector). This source of finance account for over seventy percent of deficit or public debt financing.

Selling securities is referred to as acquisition of debt. The method by which the Fed purchases or sells securities to the public is referred to as Open Market Operations. The amount of bonds to buy or sell is the exclusive decision of the Federal Reserve System Open Market Committee.

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[4]William H. Branson, Macroeconomic Theory and Policy 2nd Edition, Chapter 14, p. 308, pp. 3, 4, 5.

Problem Statement

The Reagan Administration's current approach to deal with economic problems including the deficit problem originates from the school of thought known as the "supply-side economics." By this the Administration has not only refused to increase taxes to reduce the deficit but has proposed a massive tax cuts as a strategy for stimulating the economy. This only draws attention to an otherwise ignored problem area.

The administration's tax policy has increased the deficit to a record level and puts the security market, the source of the finance immediately in the spot light. Net treasury new borrowing in the credit markets in the first quarter of 1983 was $529.6 billion--a 22.8 percent increase over the same period a year ago. This is an indication of the direct cost of servicing these debts. The cost of servicing has continued to take a large toll on the Gross National Product (GNP) and increasing in relative proportion in the yearly budget outlay (Table 2).

This assertion was confirmed by a commission of the Presidents Council of Economic Advisors, whose estimates show that transfer payment and interest on federal debt for 1983 would total $521 billion. This is about eighty-seven percent of the federal tax revenue and sixty-five percent of federal outlay and would soon climb to about eighty percent with the rate of government borrowing now.[5]

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[5]Culled from an article in the Atlanta Journal, September 11, 1983 by James L. Green, Professor Emeritus of Economy, University of Georgia.

TABLE 2

COMPARISON OF TRENDS IN INTEREST ON FEDERAL DEBT
(Dollar Amounts in Billions)

Fiscal Year	Interest on the Gross federal Debt					Interest on Debt Held by a Percent	
		Paid to					
		Federal Government Accounts	The Public				
	Total[1]		Total	Federal Reserve System[2]	Other	GNP	Budget Outlays[3]
1954.....	6.4	1.3	5.2	0.5	4.7	1.42	7.29
1955.....	6.4	1.2	5.2	.4	4.8	1.36	7.55
1956.....	6.8	1.3	5.6	.5	5.1	1.35	7.90
1957.....	7.3	1.4	5.9	.7	5.3	1.36	7.73
1958.....	7.8	1.4	6.3	.7	5.6	1.43	7.68
1959.....	7.8	1.4	6.4	.8	5.6	1.36	6.96
1960.....	9.5	1.5	8.1	1.0	7.1	1.61	8.73
1961.....	9.3	1.5	7.8	1.0	6.8	1.53	7.96
1962.....	9.5	1.6	7.9	1.0	6.9	1.45	7.40
1963.....	10.3	1.6	8.7	1.1	7.6	1.50	7.78
1964.....	11.0	1.8	9.2	1.2	8.0	1.49	7.80
1965.....	11.8	2.0	9.8	1.4	8.4	1.49	8.29
1966.....	12.6	2.1	10.4	1.7	8.7	1.44	7.75
1967.....	14.2	2.6	11.6	2.0	9.6	1.50	7.36
1968.....	15.6	3.0	12.6	2.4	10.2	1.51	7.07
1969.....	17.6	3.5	14.1	2.9	11.2	1.55	7.66
1970.....	20.0	4.4	15.6	3.5	12.2	1.61	7.95
1971.....	21.6	5.3	16.3	3.7	12.6	1.58	7.73
1972.....	22.5	5.8	16.6	3.7	12.9	1.47	7.16
1973.....	24.8	6.3	18.5	4.3	14.2	1.47	7.49
1974.....	30.0	7.7	22.4	5.5	15.9	1.62	8.29
1975.....	33.5	8.8	24.7	6.1	18.6	1.67	7.56
1976.....	37.7	9.0	28.7	6.3	22.5	1.75	7.84
TQ.....	8.3	.6	7.6	NA	NA	1.77	8.07
1977.....	42.6	9.6	33.0	6.8	26.2	1.77	8.20
1978.....	49.3	10.2	39.2	8.0	31.2	1.88	8.69
1979.....	60.3	12.1	48.3	9.6	38.6	2.05	9.78
1980.....	75.2	14.8	60.4	12.6	47.9	2.35	10.42
1981 estimate..	94.5	16.5	78.0	NA	NA	2.74	11.76
1982 estimate..	106.8	18.6	88.2	NA	NA	2.75	11.94

NA = Not available.

[1]Total interest significantly exceeds the outlays for the interest function in the budget, because the interest function includes collections of interest as an offset to outlays.

[2]These figures are approximately. For most years they estimate as the average of calendar year amounts. The 1980 estimate is tentative.

[3]Budget outlays for all years are published in the Budget, Part 9, Table 23.

Source: Special Analysis Budget of the United States Government FY 1982.

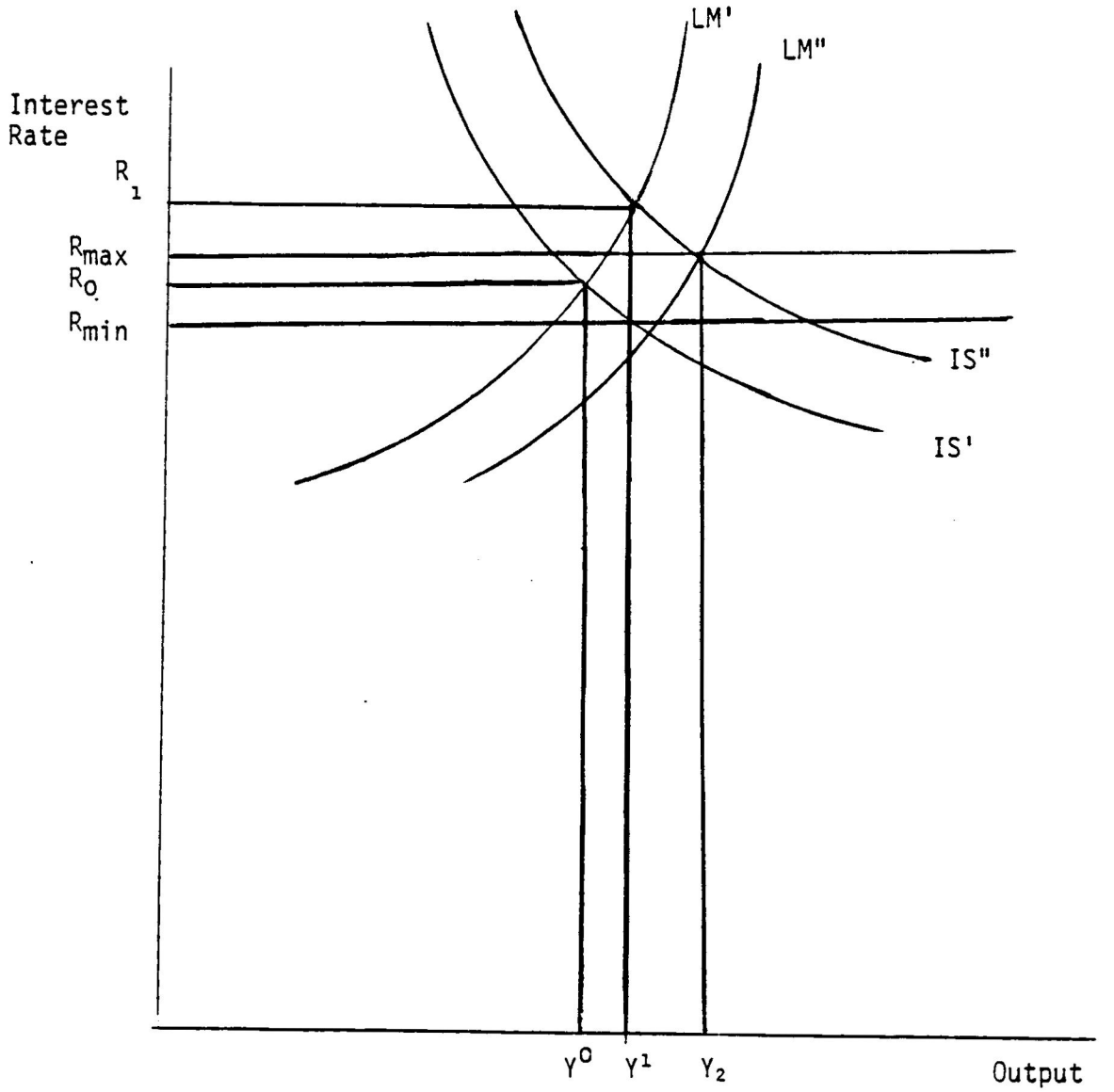
Since the sales of government security to the public accounts for over seventy percent of the source of deficit financing, the market for the source of finance needs to be thoroughly examined to identify the factors affecting it and the impact of each of these factors on the behavior of the market. In effect it is important to identify and quantify the strategic parameters that impinge on the market for government security in order to be able to predict and gauge the effects of future occurences. Few studies have been focused specifically on this type of market performance analysis even though it is of major interest to policy makers, scholars and other publics.

The activities of the Treasury sometimes run counter to those of the Fed as the main monetary policy institution. For example, if the Fed embarks on a loose monetary policy to reduce interest rate as it did in the first half of 1983, the effect of Treasury massive borrowing in the credit market neutralized this effect by preventing interest rate from making any appreciable decline. In an attempt to counter the impact of the Treasury activity on the money market the economy might end up with a high inflationary pressure. The effect of these factors may be examined diagrammatically in Figure 1.

From the Figure 1 the initial equilibrium is at intersection IS'LM' with interest rate at R_0 and income Y_0. If there is a substantial increase in government expenditure with no increase in taxes the IS curve shifts to the right to IS", with interest rate at R_1. To keep the interest rate at a desirable range (R_{max} and R_{min}) the Fed would have to increase money supply by Open Market Purchases, shifting LM' to LM". However, real income will have increased from Y_0 to Y_2, this

FIGURE 1

ISLM CURVE SHOWING THE IMPACT OF TREASURY AND FEDERAL RESERVE POLICY (FISCAL AND MONETARY) CONFLICT



may generate inflationary pressure not anticipated by the initial fiscal and monetary policy. This therefore calls for a synchronization of the activities of the two institutions.

Objectives

The overall objective of this thesis is to assess the nature of the Government Security Market. By this it intends to identify the factors (variables) affecting the demand for government securities. It would attempt to measure quantitatively the relationship of these variables and the demand for government securities. This would explain demand for government securities as a function of interest rate, maturity time (life span) and wealth. The parameters will show the elasticities of these variables. The behavior of the variables investigated would help in the management of government debt.

Justification

The demand by the public for government securities is a function of the wealth in the economy, interest rates, maturity dates (life span) and other independent variables. These represent the outlook of the government money market.

The public must be induced to buy and hold government securities by their attractivenes relative to opportunities to buy goods and services or competing investments. Therefore the terms of issue of the debt, including interest rates, maturity and other features, must be sufficiently attractive to persuade holders of public debt in the aggregate to refrain from acquiring private interest bearing securities. The thesis would throw light on two other main areas. (a) Knowledge

of public response to government security offers, is valuable in determining the quantity, interest rate and timing of the issue of public debt. This will (i) reduce the interest cost of financing the deficit (debt) to government. (ii) It will help alleviate the counter effects that Treasury activities might have on monetary policies embarked upon by the Federal Reserve. In effect the information provided will help synchronize the activities of the Treasury Department and Fed.

(b) Finally the analytical framework developed in this study should aid in the evaluation of alternative policies that may help explain persistent deficit problems that affect market economies, especially that of the United States.

CHAPTER II

LITERATURE REVIEW

A large volume of work has been done on the demand for financial assets and the variables affecting or involved in the model, particularly the money demand model. This is because of the importance of this model to effective monetary policy formulation and because of evidences of instability that this model has shown and consequently its forecasting ability. The money-demand-function is an adaptation of the demand for financial assets or vice versa. This has made results from studies in this area very important to this study.[1]

A wide variety of literature also exist on the individual nature of the variables affecting financial assets and the direction of causality. While other researchers have focussed on the demand for alternative types of risky assets. The work of James Tobin[2] remains a reference point in this area.

Marshall and Pigou are pioneers in the application of the general theory of demand to the Demand for Money, a shadow of the Cambridge theory. However the argument of Marshall and Pigou[3] were not compre-

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[1]David Laidler affirmed that the theory dealing with the problems of diversification between money and bonds is one that is capable of quite general application see Demand for Money: Theories and Evidences. 2nd Edition (New York, 1977).

[2]James Tobin, "Liquidity Preference as Behavior towards Risk," Review of Economic Studies Vol. 25, February 1958, pp. 65-86.

[3]A. C. Pigou (1917), "The Value of Money," Quarterly Journal of Economics, 37 (November), 38-65.

hensively stated until the publication of Milton Friedman's Modern Quantity Theory.[4] He based his analysis mainly on the budget constraint which here is the wealth. The wealth-owning unit either holds his wealth in an interest bearing asset or cash because of the inability to "synchronize receipt and expenditure." The wealth owner would hold his wealth in these two forms of asset to maximize his utility from both of them. Since he either holds any of the two assets, it is apparent that there would be an interplay of variables affecting demand for both of these assets. The marginal rate of substitution was applied as in the goods market to determine the optimum level of money that wealth-owning unit would like to hold.

With this principle at the background he arrived at a model of the demand for money specified thus:

$$Md = F\,(W,\ r - (1/r)\,dr/dt,\ 1/P \cdot dP/dt,\ h)\ P$$

W = Wealth

$r - (1/r)\,dr/dt$ = Expected yield from other assets

$1/P \cdot dP/dt$ = Expected price change

h = Ratio of human to non-human wealth

P = Price

He concluded that the higher the yield on other assets the lower the demand for money (utility maximization). The higher the level of wealth the higher the amount of money held.

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[4]M. Friedman, "The Quantity Theory of Money: A Restatement," Studies in the Quantity Theory of Money (Chicago).

There is a general consensus among monetarist that the money stock determines employment (income) and price (inflation) levels in the economy and therefore the money stock is what is needed to be controlled. All the same, the large body of literature on money demand has been of immense benefit to the analysis of the bond market. The analysis of the Money Demand has been put into a variety of applications in the analysis of demand for financial assets with modifications as occasions called for.

James Tobin5 introduced the different levels of riskiness associated with other financial instruments. His work was a response to the proposition of J. Keynes.6 The basic functional relationships in the Keynesian model of the economy is the liquidity preference schedule, an inverse relationship between the demand for cash balances and rate of interest. Tobin was critical as to why anybody should prefer to hold any amount of money at all other than those he would require for immediate uses, notwithstanding how low the interest rate could be, as postulated by Keynes. Using the riskiness associated with capital loss and the increases in this loss as wealth increases, he introduced a risk factor of occurrence of this loss into his analysis as another variable.

He concluded that notwithstanding the level of wealth, the amount of cash desired to be held depends on individuals indifference curve

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5James Tobin, "Liquidity Preference as Behavior towards Risk," Review of Economic Studies Vol. 25, February 1958, pp. 65-86.

6John Maynard Keynes, The General Theory of Employment Interest and Money (New York, 1936), chapters 13 and 15, especially pp. 168-172 and 201-203.

between taking risk and capital gain. With the same budget constraint (wealth) the "risk lovers" will have an indifference curve that would allow him to buy more bonds and take more risk and the nonrisk taker will tend to hold more of the less risky asset (cash) as wealth increases.

It is pertinent to mention here that the alternative to the asset being considered in the ensuing study (Government Security) is municipal bonds.

Also using the concept of utility maximization Stiglitz[7] followed up the work of K. J. Arrow and Duncan and Musgrave which are pioneering in the demand for risky assets. He investigated the authenticity of the proposition by Arrow that:

A. As wealth increases, more of the risky asset is purchased, i.e. the risky asset is superior; and

B. As wealth increases, the proportion of one's wealth in the risky asset decreases.

Stiglitz questioned the validity of the second hypothesis that individuals do allocate a smaller percentage of their portfolio to safe assets as their wealth increases.

Using a general expected utility maximization model where the marginal rate of substitution equals the slope of the budget constraint, he concluded that if the wealth elasticity is greater than unity it

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[7]J. E. Stiglitz, "The Effects of Income, Wealth and Capital Gains, Taxation a Risk Taking," Quarterly Journal of Economics, May 1969, K. J. Arrow, Some Aspects of the Theory of Risk Bearing (Helsinki, 1965).

increasing relative risk aversion and if a portfolio in Risky Asset is to increase as wealth increases, relative risk aversion must be decreasing. He found in his investigation of the effect of income tax on holding risky assets, that the increased income taxes with full loss-offset lead to increase demand for risky assets if (a) the return to safe asset is zero; (b) absolute risk aversion is constant or increasing; or (c) absolute risk aversion is decreasing and relative risk aversion increasing or constant. If none of the above conditions hold, it is possible for increased taxes to reduce the demand for risky assets.

H. E. Mantell[8] used a more refined specification of the Stigtliz utility maximization model in his work. He found that when the riskless components of the return on a risky asset and the return on the safe asset are both taxed at a proportional rate, but the capital gains return on the risky asset is untaxed, an increase in initial wealth will result in an increase in the proportion of one's wealth in the risky asset if there is decreasing absolute risk aversion. This is a contradiction of Stigliz's increasing relative risk aversion behavior proposition.

He also showed that when the riskless component is at least as large as the return on the safe asset, then an increase in the proportional tax imposed on both the riskless component and the safe return, while exempting the capital gains component of the risky assets, will result

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[8]H. E. Mantell, "The Effects of Tax Exemption of Capital Gains on Demand for Risky Investments," Quarterly Review of Economics and Business, Vol. 15, No. 4, Winter, 1975, p. 3.

in a decrease in the proportion of one's wealth in the risky assets if there is decreasing absolute risk aversion. He concluded that in cases where investors manifest decreasing absolute risk aversion, preferential treatment of capital gains will not necessarily encourage risk taking.

It is significant to point out here that all these researchers, Stigtliz, Mantell, Arrow, Duncan and Musgrave acknowledged the inconclusiveness of their theoretical analysis and recommended an empirical verification of their propositions. The empirical nature of this thesis will either lend credence or disprove the validity of the assertions of these schools of thoughts.

Empirical Review

From Fisher's technological analysis of the transaction making process, Keyne's appeal to different motives of holding money and his analysis of interest rate expectations to Friedman's appeal to the general principles of demand theory and Tobin's rationalization of the holding of diversified asset portfolios, are all capable of being assimilated in a modified general portfolio balance model of money demand.

However errors of estimation or the inability of demand equation to predict accurately the level of money demand or money stock in the economy has led to more controversy about the efficiency of the models.

Enzler, Johnson and Paulus[9] attempted to highlight some of the problems inhibiting the ability of the money demand equation. They found

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[9]J. Euzler, L. Johnson and J. Paulus, "Some Problems of Money Demand," Brookings Papers on Economic Activity, 1, 1976.

that what was described as money stock has indeed been changing with all sorts of regulations affecting different accounts. Moreover the suitability of GNP as the level of transaction came into doubt. They concluded that the cost of transactions or of holding money would go down with technological improvement therfore increasing level of money holding while the trend of introducing different forms of financial instruments will make the definition of the actual money stock ambigous and therefore difficult to pin down.

Goldfeld's[10] work was done to fill the vacuum created by the absence of any demand model with shortrun (quarterly data) analysis. Available research on demand for money were with longterm annual data whose relevance for shortterm purposes is questionable. Finally, his work was to highlight the inadequacy of the conventional money demand formulation in explaining the monetary experience of the seventies.

Goldfeld estimated a conventional equation by the least square method and adjusted for serial correlation using the Cochrane-Orchutt technique. He then carried out his analysis by comparing the performance and the speed of adjustment of different equations varying the type of interest rates and proxies used for other variables in the model.

Goldfeld found that with quarterly data, the use of income variable in the demand for money equation rather than wealth seems eminently sensible. He then reaffirmed the sturdiness of a conventional formulation of the money demand function however scrutinized. Moreover the

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[10]Stephen Goldfeld, "The Demand for Money Revisted," Brookings Papers on Economic Activity, March 1973.

conventional equation exhibits no marked instabilities in either the shortrun or the longrun. Though the model has room for improvement, substitution of wealth for income imposes a marked deterioration in the performance of the equation. This was manifested in the deterioration of its predicting ability and the R^2.

The findings of Goldfeld on wealth does not invalidate the use of wealth in the demand of government security, since wealth is the budget constraint by the utility model while income is the transaction level proxy in the money demand model.

Other researchers focused on the behavior of the variables (interest rate, wealth and maturity length) involved in this work and their impact on national debt. Prominent among this, is a commission's[11] report on Government Debt Management.

The commission noted that even when there is no change in the size of the debt interest must still be paid. This payment alone in 1960 amounted to about nine billion dollars, about a ninth of the total budget expenditures. Also, the average maturity decreased by more than half between 1946 and 1960. Further shortening of the debt results in liquidity which facilitates the activation of cash balances at time when restrictive monetary policy is employed. The problem here is that short-maturing debt are held by interest rate change sensitive investors. It then recommended the arrest of the shortening of the outstanding publicly held marketable debt which has accrued since the

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[11]Commission on Money and Credit Report published by the Board of Trustee of the Committee for Economic Development, 1961.

end of World War II. The Treasury should pursue a program which over a period of time would lead to a more balanced maturity structure for the debt.

On its cyclical management, the report recommended lengthening the debt structure during a boom because this tends to be restrictive and shortening the debt structure during a recession because this tends to be expansionary. This however raises the interest cost of the debt. It concludes that the Treasury needs to take this demand into account and work in harmony with the monetary authority in the provision of money and short term securities because to a degree, at least, one form is substituable for the other.

One of the earliest studies specifically focusing on the issues raised in this study was done by R. G. Marcis and J. K. Smith[12], The authors attempted to assess the degree of association and timing relationship between monetary policy operations and interest rate changes. They tested the hypothesis that interest rate varies in a simple causal fashion with the changes in money supply. The hypothesis was tested by examining the power spectrum for four different interest rate series and two money supply series (M_1 and M_2) and to isolate and compare the important periodic components of each. At each of these components the cross spectral statistics of coherence and phase will be used as a measure of the degree of association between the money supply series and interest rate series and the lead lag relationships between these same series respectively.

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[12]R. G. Marcis and J. K. Smith, "Monetary Activity and Interest Rates: A Spectral Analysis," Quarterly Review of Economics.

The result reveals that the money supply and interest rate series contains dissimilar periodicities. Short maturity rates appear subject to a strong seasonal effects which decrease with increases in maturity of security. Short maturity securities also appear to contain a long-run cycle of about thirty-two months duration whose strength also diminishes with increases in bond maturity. Thus it is highly probable there exist a feed back relationship from interest rates to money supply rather than a pure delay system. Consequently, it appears that the hypothesis that there is a simple "one-way" causal relationship existing between money supply changes and movements in interest rates is not supported by the spectral estimates. However the spectral estimates obtained at the longrun frequencies suggest that monetary policy operations may have the potential for bringing about desired longrun adjustment in market rates of interest.

A vast literature exist on other aspects of interest rate, one of the prime variables in this study. This was the subject of Brain Griffiths's[13] work. Contrary to popular belief, Griffiths thought that the determination of Treasury Bills Tender Rate is not an exclusive dictate of the Central Bank System (England) for the conduct of monetary policy.

The Great Depression of 1929-32 culuminated in the set of institutional arrangements in the 1930's. This arrangement provided that (a) the clearing banks lend a certain proportion of call money

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[13]Brian Griffiths, "The Determination of Treasury Bills Tender Rate," Economica, 1971.

to the discount houses at a rate of one and five-eights percent below bank rates, which is also the minimium rate at which they will buy bills; (b) The clearing banks do not compete with the discount houses by tendering for treasury bills at the weekly tender but buy them from the discount houses after they have held them for at least seven days; (c) The discount houses bid collectively at a single price for bills at the weekly tender and distribute the total quantity of bills among the members of the syndicate on a quota basis, the quota of each discount house being related to its capital resources; (d) The discount houses agree to cover the total tender at their bid price. This arrangement has only undergone slight changes since then. The implication of this is that the syndicate became a residual buyer who pays a price determined by the authorities and obtain a quantity determined by the total supply of bills and the strength of outside demand. Contrary to this popular opinion Griffiths argued that the arrangement do not directly fix the treasury bill rate as the discount houses syndicate has to use its own judgements in arriving at a bid price. Consequently, it would seem that normal price theory can be used to explain the determination of this price as of any other market price. He prefers to say that the syndicate act as a group of firms who have colluded to maximize their longrun profits, that the price is the result of its estimation of the outside tender's demand for bills and of the marginal cost of call money and its expectation of being forced into bank to borrow at a penal rate. Therefore the determination is still affected by market forces.

Summary

The literature review attempted to highlight (a) the relationship between the demand for money and bonds in particular and financial assets in general; (b) it then focused attention on some of the vast literature existing on demand for money and their underlying principles; (c) the review then tried to highlight problems typical of attempts at empirical analysis of demand for money or any other financial asset, for that matter. Towards the later stage of the review attempts were made to review opinions about the effect of the various variables that were said to affect the demand for financial assets (government bonds) on national debt management and their individual behavior.

From the literature reviewed above there is a vacuum in the government financial markets. Emphasis has always been on the monetary policy as in the work of Goldfield and other researchers. When work does exist (Report of Commission on Money and Credit, 1961) it is grossly unempirical and some of the assertions then are now open to challenge. Moreover, none of the work linked the Treasury activity (borrowing) with the Monetary Operations of the Federal Reserve. This work will therefore throw light on areas which otherwise have not been attended to.

CHAPTER III

METHODOLOGY

The initial phase of this study involved a thorough review of existing literature on the demand and supply of financial assets. The stragetic variables that operate in the financial market were identified.

The identified variables will be formulated into an economic model. This model will be quantitative since the parameters will be subjected to statistical estimation. The analysis will allow us to study the structure of demand by the public (Household and Business Sector) for public debt and it will be predictive because it will allow us to evaluate the impacts of various economic stimuli.

Data for this study will cover the period 1967 to 1981. It is hoped that this will reflect the responses during different cycles of economic activities by the public to economic stimuli. Data will be collected from the Federal Reserve's Monthly Bulletins, Economic Report of the President and Treasury Department Publications.

Theoretical Framework

Economic Model

The demand for a commodity by a consumer is a function of the satisfaction the consumer derives from consuming the commodity. These demand functions derived are contingent on continued optimizing behavior by the consumer. Given the consumer's income and prices of commodities,

the quantities[1] demanded by the consumer can be determined from his demand functions. An important property of the demand function is that there is an inverse relative between quantities and prices. Also they are homogeneous of degree zero implying that a simultaneous increase in all prices and incomes will leave the quantity demand unchanged. In general form demand is said to be a function of its own price, income and price of other goods. The impact of price is a movement along a given demand curve.

The demand for securities is analogous to the demand for other commodities. Wealth can be held in numerous forms and the ultimate wealth owning unit is to be regarded as dividing his wealth among them so as to maximize utility.

Marshall and Pigou were among the earlier scholars to use the general expected utility maximization approach model in investigating demand for financial assets (money). The Milton Friedman[2] approach is one of the latest of these model that have examined the demand for financial assets (money).

The theory uses the general principle of the Marginal Rate of Substitution between two types of assets (financial). Given a budget constraint individual will select certain security over another based on the opportunity costs attached to holding each security. The demand for government security (or any other asset, financial or real) depends

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[1]See Handerson and Quant, Micro-Economic Theory: A Mathematical Approach, 3rd ed., U.S., 1980.

[2]Milton Friedman, "The Quantity Theory of Money: A Restatement," Studies in Quantity Theory of Money (Chicago), pp. 3-4.

on three major sets of factors dictated by the utility function of the consumers, and limited by the budget constraint:

(a) The total wealth to be held in various forms - the analogue of the budget constraint;

(b) The return on this form of asset and alternative forms; and

(c) The tastes and preferences of the wealth-owning unit. The substantive differences from the analysis of the demand for a consumption service are the necessity of taking account of inter temporal rates of substitution in (b) and (c) and of casting the budget constraint in terms of wealth.[3]

The satisfacton derived from holding these assets is summarized in the individuals utility functions.

$$U = f(Y_1, Y_2) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

The individual will then seek to maximize this utility subject to his budget constraint. This is the particular level of utility that could be derived from different combinations of government security and municipal bonds. The cost of holding a particular asset (government security) other than another (municipal bonds) are the relevant opportunity costs in this case. The role played by the budget constraint (wealth) is to define the maximium amount that can be bought of whatever asset.

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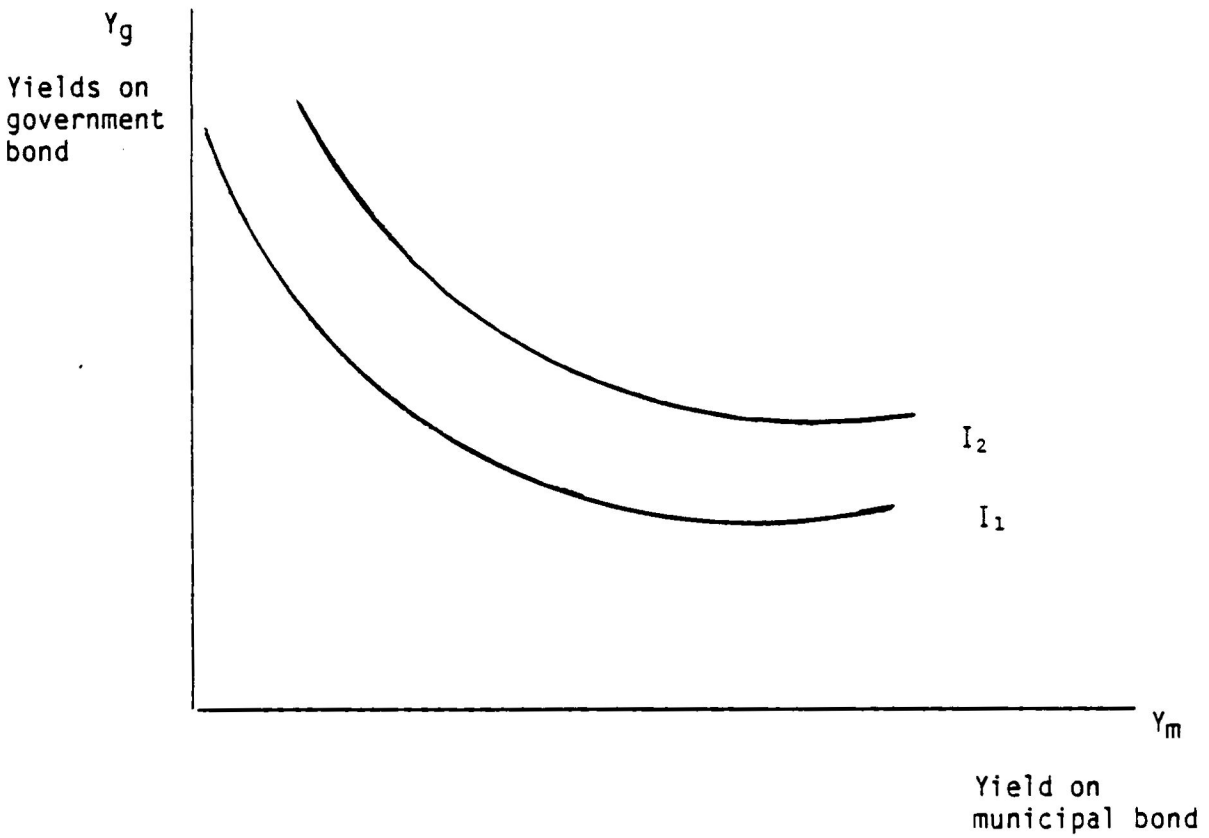
[3]Milton Friedman, "The Quantity Theory of Money: A Restatement," Studies in the Quantity Theory of Money (Chicago), p. 3.

The opportunity cost of holding U.S. government security is the income to be earned from holding other bonds (municipal bonds). The principle of diminishing marginal rate of substitution between government security and municipal bonds ensures that, if the return on municipal bonds rises the demand for government security will fall vice versa.

FIGURE 2

INDIFFERENCE CURVES OF THE CONSUMER BETWEEN GOVERNMENT BONDS AND MUNICIPAL BONDS



The budget constraint and the indifference curve thus takes the form as in the goods market shown below. The negative slope of the indifference curve becomes larger algebrically and smaller in absolute value as Q_1 is substituted for Q_2, i.e. rate of commodity substitution decreases.

$MU_g/MU_m = Y_g/Y_m$ = RCS (Rate of commodity substitution)

MU_g = Marginal utility of government bonds

MU_m = Marginal utility of municipal bonds

Y_g = Yield on government bonds

Y_m = Yield on municipal bonds

The return on these two assets has two components. First the interest income yielded by them and second the way in which their market prices are expected to vary for their capital gain or losses. The price of income-earning assets varies inversely with the market rate of interest, so that the expected percentage rate of change of this rate of interest can be used to measure capital gain and loss from holding other assets. The percentage rate of change of the rate of interest is of course opposite in sign to the rate of capital gain (or loss). It is here being used to measure and it must be subtracted from the rate of interest itself to obtain the expected yield on asset.[4]

Therefore an indirect utility function of an individual holding government bonds and municipal bonds may be represented symbolically as:

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[4]D. T. Laidler, The Demand for Money: Theories and Evidence, 2nd edititon (New York, 1977).

$$U = \phi [\, R_g - (1/R_g)\, dR_g/d_t,\ R_m - (1/R_m)\, dR_m/d_t \,] \ldots\ldots (2)$$

where R_g = Interest rate on government bonds

$(1/R_g)\, dR_g/d_t$ = The expected percentage rate of change of government security interest rate

R_m = Municipal bond interest rate

$(1/R_m)\, dR_m/d_t$ = The expected percentage rate of change of municipal bond interest rate

The theoretical model discussed above suggest that:

$$Q_g = f [\, R_g - 1/R_g\, (dR_g/d_t),\ R_m - 1/R_m\, (dR_m/d_t),\ W \,] \ldots (3)$$

Q_g = Values of government security purchased

W = Wealth

With the following restrictions being put on the relationship between the variables in question, Q_g is positive and R_g is positive and $1/R_g\, (dR_g/d_t)$ does not exceed R_g.

$$\frac{dQ_g}{d\,[R_g - 1/R_g\, (dR_g/d_t)\,]} > 0$$

Other things being equal, the higher the yield on government security, the higher the demand for it.

$$\frac{dQ_g}{d\,[R_m - 1/R_m\, (dR_m/d_t)\,]} < 0$$

Other things being equal, the higher the yield on municipal bonds (other assets) the smaller the demand for government security.

$$dQ_g/dW > 0$$

Other things being equal, the higher the level of wealth the greater the value of government security held. Also, if all interest rates were to change proportionately, then demand for government security will not change.

This model has been the most prominent in the analysis of the demand structure of financial assets generally.[5] It is considered adequate for the purposes of this study principally for its simplicity in explaining an area as complex as the market for financial assets.

Empirical Implication

A major empirical problem in this type of analysis is the movement of interest rate on the various financial instruments in the same direction. This might lead to a multicollinearity problem. One of the ways to avoid this problem is to use a relative yield measurement instead of two different yields. This is by dividing yield on government bonds by yield from municipal bonds, that is,

$$\frac{R_g - 1/R_g \, (dR_g/d_t)}{R_m - 1/R_m \, (dR_m/d_t)} = R_r$$

Data on wealth is very difficult to come by if it existed at all. This is one of the problems of the financial asset analysis. A way to

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[5]See M. Richren, "Cardinal Utility, Portfolio Selection and Taxation," Review of Economic Studies XXVII, June 1960; M. Friedman, The Quantity Theory of Money (Chicago); K. J. Arrow, Essays in the Theory of Risk Taking (New York, 1973); and Some Aspects of the Theory of Risk Bearing (Holsinki, 1965); R. Musgrave, Theory of Public Finance (New York, 1969); J. Mossin, "Taxation and Risk Taking: An Expected Utility Approach," Economica XXXV, February 1968.

get around this is to define wealth as the discounted present value of expected future income[6] and so long as the rate of discount used can be regarded as constant, wealth varies in exactly the same fashion as expected income. If expected income rises by ten percent, so will wealth. If it falls, so will wealth.

The expected future income was calculated using the Friedman method in the consumption model. The estimated relationship therefore becomes:

$$Q_g = f(R_r, I_f) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

R_r = Relative yield

I_f - Discounted present value of expected future income

The identified variables were assumed to be related in a multiplicative fashion, therefore the estimated equation could be represented as:

$$Q_g = R_r^{\beta_1} \; I_f^{\beta_2} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (5)$$

The exponents being coefficients of the respective variables. And upon obtaining partial derivations for

$$dQ_g/dR_r > 0$$

and $$dQ_g/dI_f > 0$$

the resulting β_1 and β_2 coefficients may be interpreted directly as elasticities.

Several other factors affect the demand for securities generally at various times of the year. These include political, economic and other developments even outside the country. It is assumed that those represented above are those with consistent influence on the dependent

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[6]See D. Laidler, The Demand for Money: Theories and Evidence, 2nd edition, p. 106.

variable. The influence of those left out are assumed to be little and is captured in the error term so that the smaller the error term, the better is our estimate relationship.

The estimation will be carried out for the three identified types of securities.

(a) Those maturing within one year (short term)

(b) Those maturing between one to five years (intermediate)

(c) Those maturing over five years (long term)

The three equations to be estimated therefore are:

(1) $Qg_1 = Rr_1^{\beta 11} \; If_1^{\beta 21}$ - Short term

(2) $Qg_2 = Rr_2^{\beta 12} \; If_2^{\beta 22}$ - Intermediate

(3) $Qg_3 = Rr_3^{\beta 13} \; If_3^{\beta 23}$ - Long term

With 1, 2 and 3 representing short term, intermediate and long term respectively. This would help identify the behavior of the public to the changes in the variables to the different classes of securities. The method by which equations are specified allow us to directly measure the effect, if any, of the life span of a security on its demand.

Statistical Model

To transform equation (5) to a statistical form, a stochastic (error) term would be included thus:

$$Q_g = R_r^{\beta_1} \; I_f^{\beta_2} e^{ut} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (6)$$

Since equation (5) is curvilinear, the error term too has been rewritten in base form to unify the formation of the equation.

Expressing the above equation in linear form, the log of the equation is taken. The linearity makes the estimation simpler.

Thus equation (6) becomes:

$$LNQ_g = \beta_o + \beta_1 \ LNR_r + \beta_2 \ LNI_f + U^t \ldots\ldots\ldots\ldots\ldots \quad (7)$$

β_i ..... β_j being elasticities due to changes in the corresponding variables.

The expected value of the error term (U^t) is equal to zero, with finite variance which is normally distributed and mean equals zero with variance σ^2.

That is: $E(U_i) = 0$

and $V(U_i) = \sigma^2 < \infty$ for all i

However, $COV(U_i \ U_j) \neq 0$ for all i, j, $i \neq J$

Multiple regression procedures were used to estimate the parameters of the model.

CHAPTER IV

ANALYSIS

The results of the estimation procedure are reported in Tables 3 to 6.

Short-term Security

TABLE 3

ELASTICITIES OF VARIABLES IN THE SHORT TERM GOVERNMENT SECURITY

Variables	Elasticities	Standard Errors	R^2
Relative Yield	- 0.1840	0.1109	0.9674
Expected Future Income	1.2081	0.0767	
Constant	2.8147	0.5525	

F - Test = 177.9752 > 4.6 F (1, 14), D.W. = 0.6775

From Table 3 the estimated equation will be:

$$Q_{g_1} = \underset{(0.5525)}{2.815} - \underset{(0.1110)}{0.184}\ R_{r_1} + \underset{(0.0767)}{1.208}\ I_f \quad \ldots\ldots\ldots\ldots \quad (4.1)$$

The overall performance of selected variables in explaining the variation in short-term government security is quite good. The coefficient to determination 0.97 indicates that ninety-seven percent of variation in endogenous variable is explained by yield and income variables. The result indicate that there is a negative relation between short-term security and relative yield (R_{r_1}). The variable is, however, statistically insignificant in explaining the variation in the endogenous variable (short-term government security). However, there

is a positive response between short-term government security and the expected future income. The standard error on expected future income indicates that this variable is significant in explaining the variation in the value of government securities held by the public. The equation also has a high intercept which is very significant. This implies that notwithstanding, the income or yield changes the public will still purchase short-term security.

The yield on short-term government security or any security for that matter is usually lower than long term securities. The results are therefore not too surprising. It is therefore possible that the public do not react very much to little variation in short-term yields. However, their expected future income and the sheer liduidity of the short term determines the purchase of these securities. The brevity of the life span of the short-term security makes its liquidity much higher than the intermediate and the long-term securities. There is need for further investigation to determine whether the behavior of short-term security identified in this study is consistent within other specification. The use of quarterly data is suggested since this would show a better variation.

The model itself showed a powerful explanatory ability. The independent variables have accounted for 96.7 percent of the variations in the dependent variable, leaving less than four percent unaccounted for.

The F-test shows how significant the explanatory power of the model is.

Intermediate Security

From Table 4 below the estimated equation for intermediate securities is:

$$Q_{g_2} = 3.8300 + 0.0428\ R_{r_2} + 1.0214\ I_{f_2}$$
$$(0.8103)\ (0.0248) \qquad (0.1109)$$

In this model there is a positive relationship between the yield variable and the endogenous variable. This elasticity is less than unitary. However, it is consistent with theoretical prediction. The estimated equation is not significant (t-Test value = 1.7255) at five percent significant level. This is expected to be very significant

TABLE 4

ELASTICITIES OF VARIABLES IN THE INTERMEDIATE GOVERNMENT SECURITY

Variables	Elasticities	Standard Errors	R^2
Relative Yield	0.0428	0.0248	0.8804
Expected Future Income	1.0214	0.1109	
Constant	3.8300	0.8103	

F - Test = 44.1680 > 4.60 F (1, 14), D.W. = 1.207

at ninety percent confidence interval (ten percent significant level). This only reaffirm the theory that it requires an inducement (yield) to convince the public to hold more government security. As it will be shown later in the long term security, the high significance of interest

rate (yield) showed interest rate account for some of the variations in the value of long-term government security held by the public.

The wealth proxy here (expected future income) like in the short term showed a unitary positive elasticity to the endogenous variable. The elasticity is highly significant in determining the variation in the endogenous variable. This is also consistent with the theory. Both income and interest rates are important in explaining variation in the quantity of medium-term bonds demanded.

In this equation also, it is clear that, notwithstanding the influence of interest rate (yields) and income changes, the public will still purchase intermediate government security. This is shown by the high intercept term and the high significance.

The model like in the short term showed a strong explanatory power with eighty-eight percent of the variation in the endogenous variable accounted for by the model. Though it showed less ability than the short term, its performance is satisfactory. The F-test also shows that our model is adequate in explaining the demand for intermediate securities.

Long-term Security

From Table 5, the estimated equation is:

$$Q_{g_3} = 6.6894 + 2.7592\ R_{r_3} + 0.4609\ I_{f_3}$$
$$(1.6177)\ (1.2615) \qquad (0.2471)$$

More than the short term and intermediate securities, the long term showed more than unitary elasticity for yield which is highly significant. This is an improvement on the responses shown by the two other securities to yield. The result is consistent with economic theory.

TABLE 5

ELASTICITIES OF VARIABLES IN THE
LONG TERM GOVERNMENT SECURITY

Variables	Elasticities	Standard Errors	R^2
Interest	2.7593	1.2615	0.7101
Expected Future Income	0.4609	0.2471	
Constant	6.6894	1.6177	

F - Test = 14.69334 > 4.60 F (1, 14), D.W. = 0.6133

However, the elasticity due to changes in expected future income (wealth) fell to less than unitary, showing a decreasing wealth elasticity from the short term through the intermediate to the long term. The significance of wealth also decreased appreciably (t-value of 1.87). This signifiance is nevertheless expected to improve when tested in the ninety percent confidence interval.

The large coefficient of the intercept term and its statistical significance indicates that people will still hold long-term government bonds irrespective of changes in income and interest rate. This could be so since banks could hold part of their reserve requirements in treasury bills. They might want to hold government security notwithstanding the low yields. There is also a relatively low risk associated with government bonds compared to other assets. This is a factor that has not been considered in this work but was very prominent in Tobin's article.[1]

[1]See J. Tobin, "Liquidity Preference as Behavior Towards Risk," Review of Economic Studies, Vol. 5, February 1958.

The effect of this will be responsible for the high intercept term irrespective of what variables are indicated in the model. This would certainly be a useful investigation with interesting results if undertaken.

The power of explanation of the variable is relatively low compared to those of short term and intermediate. However, it remains significant with F-test = 14.69 at ninety-five percent confidence interval.

TABLE 6

COMPARISON OF THE PERFORMANCE OF THE THREE DIFFERENT SECURITIES

Equations	R^2	F-Test	D.W.
Short Term (1)	0.9674	177.9752	0.6775
Intermediate (2)	0.8804	44.1680	1.2066
Long Term (3)	0.7101	14.6933	0.6133

dL = 0.95 and dU = 1.54 (k = 3, n = 15)

Testing for auto-correlation, the short term d = .67745 < dL therefore showing the presence of positive auto-correlation. For the intermediate, the result was inconclusive since $d_L < d < dU$. However, the long term, like the short term, showed positive auto-correlation.

The incidence of serial correlation is peculiar in financial asset demand/supply analysis. This problem was highlighted by Stephen Goldfeld[2] and other scholars in other studies. Our present results

[2]Stephen M. Goldfeld, "The Demand for Money Revisited," Brookings Paper on Economic Activity 3:1973.

should therefore not be too surprising. It was suggested that an increase in "n" (number of observations) or the use of quarterly data might minimize the problem of serial correlation. This is recommended for further investigation. The problem of serial correlation is prevalent with time series analysis because of the underlying trend in time series data. In a study of this nature, Goldfeld used the Cochrane-Orchutt technique for correction of serial correlation in conjunction with ordinary least squares. Though this method of correction of serial correlation reduced the Root Mean Square Errors of the Ordinary Least Square estimates by about forty percent,[3] this however never improved the significance of the variables. While it might have been desirable to use simultaneous equation technique throughout this analysis, the performances of this technique in previous works (Goldfeld) suggests that the results would not be quantitatively affected by such a procedure.

Conclusion

From the results discussed above, it is clear that given a certain level of wealth held by individuals, the length of the maturity time more than yield of security is the major factor that determines the demand for government security. This is especially true with short-term securities that showed an insignificant negative elasticity to interest yield. Though the effect of yield improves with the length of the life span of the security, the high intercept and the high significance show

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[3]See the work of Stephen Goldfeld, The Demand for Money Revisited," Brookings Papers on Economic Activity, 3:1973.

the importance type of maturity has in determining which (short, intermediate, or long-term) is purchased by the public. This takes us back to a point raised earlier that the preference or how close the public wants to stay to liquidity would be an important new dimension to this study.[4]

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[4]James Tobin made a concise analysis of the liquidity preference in his article "Liquidity Preference as Behavior Towards Risk."

CHAPTER V

RECOMMENDATION

Based on the results of this study we may conclude that income and the mere short term life span of the security motivate the public rather than the yield on government security. The issuing of short-term public debt during the period of recession, high unemployment and rising interest rate will be very beneficial to the government. This will reduce interest cost of financing public debt.

Since interest payment on public debt accounts for a high proportion of government annual budget outlay, a significant reduction of this interest payment will reduce the size of the budget deficit.

This seems to be consistent with the recommendations of the National Commission on Credit and Money.[1] However a dimension that was not considered here was whether the velocity of maturity of the short-term security which the commission said would activate cash balances as a result of it liquidity would nullify the inverse effects of interest rate in reducing cost of public debt. Moreover, the government would have a choice whether to accept to lower interest cost of public debt by issuing early maturing debt instrument and risk activation of high

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[1]Commission was of the opinion that short-term debt are held by interest rate-change-sensitive investors and recommended the shortening of the debt structure during a recession because this tends to be expansionary. However acknowledged this raises the interest cost of the debt-see literature reviewed in chapter 11.

cash balances because of the ensuring liquidity of the short-term securities, when restrictive monetary policy should be employed.

Since the public is indifferent to short-term interest yield (insignificant elasticities) in purchasing government security, the issuing of short-term instrument will after all not affect market (prime, mortgage, etc.) interest rates. This therefore does not affect Federal Reserve activity in its control of interest rate.

However, the high response shown by intermediate and long-term securities to interest rates would certainly affect market interest rates. Therefore, in synchronizing its activities with the Federal Reserve, the Treasury could issue an interest non-triggering short-term security to finance its deficit when Federal Reserve is lowering interest rate. When Federal Reserve is adjusting interest rates upward, the Treasury could issue intermediate and long-term interest responsive securities to raise the market interest rates. This way the activity of the Treasury Department would be complementary to those of the Federal Reserve.

As highlighted in this research, a lot of areas still need to be investigated to throw more light into the Government financial market analysis.

(a) Research could be conducted increasing the "n" (number of observations) in this analysis. This is with the hope of correcting the problem of auto-correlation encountered in this work.

(b) Also a combination of the least Square and Cochrane-Orchutt technique could be used to correct the seria correlation problem.

A couple of omissions also existed in this work that might be very useful to further investigate in this area. This include: (a) the introduction of lag variables into the model. This would highlight the impact of the speed of adjustment with changes in interest rate and income. (b) A variable to act as proxy for the velocity of maturity (liquidity of the securities) will quantitatively measure the impact of the velocity of maturity in this model. (c) The absence of any measure of risk associated with holding bonds, either Government or municipal, might be a grave omission in the Friedman model and which was also seriously criticized in the Keynesian model by James Tobin. An introduction of the probability of risk associated with the bonds will shed more light on this analysis.

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APPENDIX

THE BUDGET FOR FISCAL YEAR 1982

Table 10. BUDGET RECEIPTS BY SOURCE

(In millions of dollars)

Source	1980 actual	1981 estimate	1982 estimate
Individual income taxes:			
Withheld	223,763	261,783	307,304
Other	63,785	70,449	81,532
Proposed legislation		−529	−2,799
Gross individual income taxes	287,548	331,703	386,037
Refunds	−43,479	−47,690	−54,360
Net individual income taxes	**244,069**	**284,013**	**331,677**
Corporation income taxes:			
Existing law	72,380	74,988	81,979
Proposed legislation		−825	−8,617
Refunds	−7,780	−8,154	−8,714
Net corporation income taxes	**64,600**	**66,009**	**64,648**
Social insurance taxes and contributions (trust funds):			
Employment taxes and contributions:			
Old-age and survivors insurance	96,581	116,342	126,781
Proposed legislation			203
Disability insurance	16,639	12,202	21,357
Proposed legislation			38
Hospital insurance	23,233	29,915	35,526
Proposed legislation			42
Railroad retirement	2,312	2,592	2,784
Proposed legislation			268
Total employment taxes and contributions	138,765	161,051	186,999
Unemployment insurance:			
State taxes deposited in Treasury[1]	11,915	12,606	15,517
Proposed legislation			−57
Federal unemployment tax receipts[1]	3,246	3,558	3,975
Railroad unemployment tax receipts[1]	175	174	207
Total unemployment insurance	15,336	16,338	19,642
Contributions for other insurance and retirement:			
Supplementary medical insurance	2,928	3,314	3,873
Federal employees' retirement—employee contributions	3,660	4,043	4,073
Other retirement contributions[2]	59	77	78
Total contributions for other insurance and retirement	6,646	7,435	8,023
Total social insurance taxes and contributions	**160,747**	**184,824**	**214,664**
Excise taxes:			
Federal funds:			
Alcohol taxes:			
Distilled spirits	3,919	3,850	4,020
Beer	1,545	1,590	1,615
Rectification tax	8		
Wines	211	202	222
Special taxes in connection with liquor occupations	21	21	21
Administrative action		90	125
Refunds	−184	−110	−114
Total alcohol taxes	5,601	5,643	5,889
Tobacco taxes:			
Cigarettes	2,403	2,553	2,587
Cigars	40	40	40
Cigarette papers and tubes	1	1	1
Other	3	3	3
Administrative action		106	1
Refunds	−4	−3	−3

Table 10. BUDGET RECEIPTS BY SOURCE—Continued

(In millions of dollars)

Source	1980 actual	1981 estimate	1982 estimate
Total tobacco taxes	2,443	2,700	2,629
Manufacturers' excise taxes:			
Gasoline	31	31	29
Firearms, shells, and cartridges	75	81	88
Fishing rods, creels, etc	34	38	44
Pistols and revolvers	22	28	31
Bows and arrows	6	7	7
Gas guzzler tax	2	45	50
Windfall profit tax	5,959	22,231	34,677
Other	*		
Proposed legislation		3,470	11,188
Refunds	−6	−18	−18
Total manufacturers' excise taxes	6,122	25,913	46,096
Miscellaneous excise taxes:			
General and toll telephone and teletype service	1,118	1,013	790
Wagering taxes, including occupational taxes	12	14	17
Employee pension plans	3	3	3
Tax on foundations	68	75	77
Foreign insurance policies	75	99	125
Other	2	1	1
Refunds	−32	−24	−20
Total miscellaneous excise taxes	1,246	1,181	993
General fund collections associated with expiration of airport and airway trust fund:			
Existing law		1,281	1,377
Proposed legislation		−144	−1,377
Total general fund collections associated with expiration of airport and airway trust fund taxes		1,137	
Undistributed Federal tax deposits and unapplied collections	152	188	229
Total Federal fund excise taxes	15,563	36,762	55,836
Trust funds:			
Highway:			
Gasoline	4,011	4,183	3,895
Trucks, buses, and trailers	912	891	1,176
Tires, innertubes, and tread rubber	680	725	742
Diesel fuel used on highways	523	528	554
Use-tax on certain vehicles	277	286	282
Truck parts and accessories	253	316	346
Lubricating oils	105	115	112
Proposed legislation		−9	3,402
Refunds	−142	−154	−147
Total highway trust fund	6,620	6,881	10,362
Airport and airway:			
Transportation of persons	1,601		
Waybill tax	92		
Tax on fuels	70		
International departure tax	92		
Aircraft registration fees	21		
Tires and innertubes	1		
Proposed legislation		316	2,795
Refunds	−3		
Total airport and airway trust fund	1,874	316	2,795
Black lung disability insurance trust fund	272	275	292
Inland waterway trust fund		30	58
Hazardous substances response trust fund		129	290

Table 10. BUDGET RECEIPTS BY SOURCE—Continued

(In millions of dollars)

Source	1980 actual	1981 estimate	1982 estimate
Total trust fund excise taxes	8,766	7,631	13,797
Total excise taxes	**24,329**	**44,393**	**69,633**
Estate and gift taxes	**6,389**	**6,909**	**7,668**
Customs duties	**7,174**	**7,439**	**7,800**
Miscellaneous receipts:[3]			
Miscellaneous taxes	288	103	110
Deposit of earnings, Federal Reserve System	11,767	13,069	14,710
Fees for permits and regulatory and judicial services:			
Immigration, passport, and consular fees	65	70	74
Proposed legislation	.....	.....	45
Administrative action	.....	19	35
Patent and copyright fees	27	27	26
Registration and filing fees	122	131	136
Import fees on crude oil and petroleum products	−11	.....	.....
Coal mining reclamation fees	199	211	223
Miscellaneous fees for permits, licenses, etc	41	38	21
Miscellaneous fees for regulatory and judicial services	71	75	81
Fees for legal and judicial services	2	.....	.....
Total fees for permits and regulatory and judicial services	516	570	642
Fines, penalties, and forfeitures	190	196	197
War reparations and recoveries under military occupation	5	5	5
Gifts and contributions	31	25	27
Refunds and recoveries	−55	−30	.....
Total miscellaneous receipts	**12,742**	**13,938**	**15,690**
Total budget receipts	**520,050**	**607,525**	**711,780**
MEMORANDUM			
Federal funds	350,849	415,239	484,105
Trust funds	213,875	242,545	286,113
Interfund transactions	−44,674	−50,259	−58,437

* $500 thousand or less.

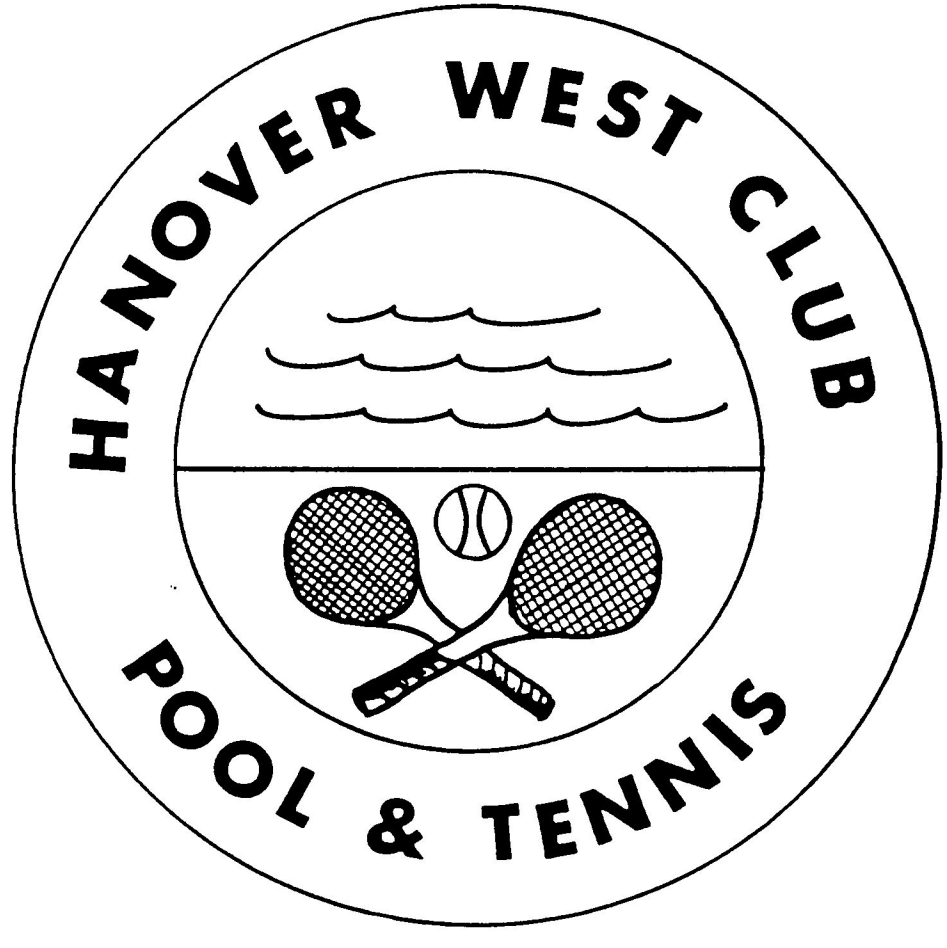
[1] Deposits by States are State payroll taxes that cover the benefit part of the program. Federal unemployment tax receipts cover administrative costs at both the Federal and State level. Railroad unemployment tax receipts cover both the benefits and administrative costs of the program for the railroads.

[2] Represents employer and employee contributions to the civil service retirement and disability fund for covered employees of Government-sponsored, privately owned enterprises and the District of Columbia municipal government.

[3] Includes both Federal and trust funds. Trust fund amounts in miscellaneous receipts are: 1980, $54 million; 1981, $54 million; and 1982, $76 million.

Note.—Estimates for 1981 and 1982 include effects of proposed legislation and administrative action.

1983



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